

Characterization of rainfall of different sub montane zone for Maharashtra state

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Received : 27.03.2012; Revised : 25.08.2012; Accepted : 26.09.2012

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■ **ABSTRACT** : The daily rainfall data for the period of 13 years (1989-2001) of different 15 rain gauges stations from the sub montane zone of Maharashtra were collected considered for analysis. Average weekly rainfall of all stations was calculated from the daily rainfall. The weekly assured rainfall values at 50 and 75% probability levels were computed by incomplete gamma distribution. Weekly assured rainfall was considered for moisture availability index (MAI). The wet and dry spells were calculated by Markov Chain model. The onset and withdrawal of monsoon were decided by weekly rainfall frequency distribution method. The overall situation of the moisture availability period, onset and withdrawal of monsoon assured rainfall, dry and wet spell. From the assured total rainfall at 50 to 75 per cent probability it is clear that the maximum rainfall was received in the month of July and August especially in 28, 29 and 30 mw.

■ **KEY WORDS** : Rainfall characterization, Moisture availability index (MAI), Markov chain Model

■ **HOW TO CITE THIS PAPER** : Chichorkar, S.S., Sayyad, F.G., Patel, G.R., Patel, S.K. and Yaduvanshi, B.K. (2012). Characterization of rainfall of different sub montane zone for Maharashtra state. *Internat. J. Agric. Engg.*, 5(2) : 240-243

Agriculture is the backbone of Indian economy. Agricultural production is closely related with rainfall. Advanced farm technology has a great potential to increase crop production. The main reason for very low and highly unstable yields in these areas is the availability of adequate soil moisture during active growth period of the crops. Onset, progress, intensity, temporal and spatial distribution of monsoon rains decides the fate of dry land agriculture. The distribution of rainfall is the matter of more serious concern than the total amount of rainfall.

The farmers have adopted their farming system by experience of generations without proper knowledge of agro-climatic conditions, effective cropping pattern and importance of scheduling of irrigation. Hence, study of rainfall characteristics is very important in general and drought prone areas. This includes mean rainfall, its deviation and variability, withdrawal of monsoon, the duration, and frequency with their interaction with crop and soil so that this resources can be put to more efficient use in agricultural planning.

The cropping patterns are basically dependent on MAI. Hargreaves (1971) defined MAI is the ratio of assured rainfall expected at 75% probability level and estimated potential evapotranspiration for the concerned period. Bhishnoi (1980) has defined MAI as

$$MAI = AE/PE$$

where MAI = Moisture Adequacy Index, AE= Actual evapotranspiration, PE= Potential evapotranspiration

The knowledge of rainfall variability and MAI with the soil type of particular area is necessary. MAI is the prime factor for crop planning, especially in the tropics where it varies both in time and space. MAI were worked out on the basis of average monthly rainfall (Raman and Murthy, 1971) and crop planning was done. If there are dry spells in between, causing crop failure the monthly MAI at different risk levels for agricultural planning of majority of season's crops, the weekly MAI values will be more suitable.

■ METHODOLOGY

The weekly meteorological rainfall data of different stations under sub montane zone of Maharashtra state was collected for the study and rainfall variability, Potential evapotranspiration (PET), moisture availability index (MAI), moisture availability periods etc. were computed. The data were collected from India Meteorological Department (IMD), Pune from 13 years (1989-2001) were available which has been analyzed. For MAI calculation actual weekly rainfall data were used.

The Markov chain model was used to estimate the conditional probability of dry and wet spell. For determining dry and wet spell the limit of 15 mm rainfall at initial growth